

as long as the plate, separating the pairs of tube-feet. All these are hyaline, fluted, and invested in a felt of membrane and microscopic pedicellariæ.

Actinostome large. Mouth-plates very small; each plate is made up of two adambulacrals so incompletely fused that in place of the usual groove there is a ligamentous symphysis between the two plates, and each bears the usual furrow and cross-furrow spinelets unchanged and the actinal spine not much changed—only diminished in size in the distal (aboral) plate.

Madreporiform plate marginal, small, deeply cross-fissured, radially striated. A membranous (epiproctal?) appendage is found on the disk excentrically.

Colours in the fresh state dull reddish ochre.

Off the Konkan Coast, 559 fathoms, green sand.

This species is well characterized by the strong contortion of the calcareous ridges at the base of the rays and their hoop-like lateral elevation; by the incomplete fusion and partially ligamentous union between the two adambulacral elements that make up a mouth-plate; and by the curious membranous epiproctal (?) appendage.

FREYELLA, Perrier.

55. *Freyella tuberculata*, Sladen.

*Freyella tuberculata*, Sladen, 'Challenger' Asteroidea, p. 638, pl. cxvii. figs. 1-3.

Bay of Bengal, 1840 fathoms, *Globigerina*-ooze.

56. *Freyella benthophila*, Sladen.

*Freyella benthophila*, Sladen, 'Challenger' Asteroidea, p. 641, pl. cxi. figs. 5-8; and in Wood-Mason and Alcock, "Indian Deep-sea Dredging," Ann. & Mag. Nat. Hist., Dec. 1891, p. 440.

Bay of Bengal, 1520 to 1997 fathoms, usually on *Globigerina*-ooze.

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XVI.—*Report upon the Myriopoda of the 'Challenger' Expedition, with Remarks upon the Fauna of Bermuda.* By R. I. Pocock, of the British Museum (Natural History).

[Plate IX.]

SINCE marine biological research was the main object of the cruise of the 'Challenger,' and the capture and preservation of terrestrial forms but a pastime, so to speak, of the zoologists

on board, it is not difficult to understand why the species collected from time to time inland of the different ports that were touched at, were for the most part considered by those into whose hands they ultimately fell to be, if of interest at all, certainly not worthy of special reports. However justifiable this opinion was touching the majority of the land-forms of life, it can scarcely be said to hold good when we take the Myriopoda into consideration. Nor is this a surprising fact, seeing that many of the localities visited were isolated islands or localities rarely, if ever, explored by collectors; and consequently a large percentage of new forms was obtained—large, that is, considering that those who discovered them were without experience of the group, and merely picked up such specimens as presented themselves during the search after land-forms in general. But, apart from the new species, of which the value can only be appreciated by a specialist, the interest of the collection touching geographical distribution is in some respects very great. This is notably the case with regard to Bermuda.

Prior to the small report published by Mr. Bollman upon the Myriopoda obtained by Dr. Angelo Heilprin in Bermuda, I am not aware that any species of the group—authentically named or otherwise—have been recorded from this island.

Mr. Bollman mentioned five species in his paper; in the 'Challenger' collection there are in all seven, five of them being new to the locality and two of them doubtfully new to science.

The following is a complete list of the known species, with notes respecting their extra-Bermudan distribution:—

1. *Scutigera coleoptrata* (Linn.).

Common in South and West Europe, Madeira, and Azores, and probably introduced into Bermuda from the east. Not Antillean; but possibly Nearctic, if *Sc. forceps* is the same species.

2. *Lithobius provocator*, Pocock.

Certainly closely allied to, if indeed it be truly distinct from, the common European and N.-American *L. forficatus*. Not Antillean.

3. *Lithobius bermudensis*, Pocock.

Also a doubtful species. No doubt of European or Nearctic origin. Almost certainly not Antillean, the genus *Lithobius* being unknown in the West Indies.

4. *Lithobius lapidicola*, Meinert.

This species was identified with some hesitation by Bollman, to whom authentic examples of *L. lapidicola* were unknown. I see no reason, however, for doubting the correctness of the determination, seeing that *L. lapidicola* is a tolerably common European form and occurs also in Madeira.

5. *Scolopendra subspinipes*, Leach.

A widely distributed tropical species. Occurring commonly in the West Indies, whence it has doubtless made its way to Bermuda.

6. *Mecistocephalus Guildingii*, Newp.

Recorded by Bollman. A West-Indian species; occurs also in Demerara.

7. *Strongylosoma coarctatum* (Sauss.).

Like *Scolopendra subspinipes*, this is a widely distributed tropical species. Abundant in Guyana and the West Indies; occurs also in Europe, but only in conservatories or places to which tropical plants have been imported.

8. *Strongylosoma Guerinii*, Gervais.

Common in Teneriffe, Madeira, Algeria, &c., but not known upon the western side of the Atlantic.

9. *Iulus Moreleti*, Lucas.

Common in the Azores and Madeira, and closely allied to several species of the South-European fauna.

10. *Spirobolus monilicornis*, Porath.

Described from Bermuda under the name *Sp. Heilprini* by Bollman; but Bermudan specimens are not specifically distinguishable from others occurring in many of the West-Indian Islands and in Demerara, which are almost certainly *monilicornis* of Porath.

From the above list it will be seen that out of the ten known species four have been doubtless introduced from the West Indies, three are either of Palæarctic or Nearctic origin (*i. e.* nos. 1, 2, and 3), while the remaining three belong

unquestionably to the Mediterranean fauna of the Palæarctic region.

Thus the western Palæarctic element is almost equal to the Antillean—a circumstance which is both interesting and surprising, seeing that the plants, land-mollusca, insects, and spiders appear to be almost wholly West-Indian or East-American.

Also of considerable interest was the small series of species obtained from Teneriffe, showing the distinctly Mediterranean character of the mainland fauna of this island.

## Class CHILOPODA.

### Fam. Scutigeridæ.

#### *Scutigera coleoptrata* (Linn.).

*Loc.* Bermuda.

#### *Scutigera planiceps*, sp. n.

*Scutigera rugosa*, Porath, "Myriopoda Africæ australis in Museo Regio Holmiensi asservata," (Efv. Vet.-Akad. Förhandlingar, 1871, no. 9, pp. 1138, 1139 (not *Scutigera rugosa*, Newport, Linn. Trans. xix. p. 353, 1845).

*Loc.* Simon's Bay (Cape Town). A single specimen.

Porath's description of this species is sufficiently accurate to leave no doubt as to the specific identity of his specimens with the one mentioned above. But since these specimens are certainly totally distinct from *rugosa* of Newport, the type of which is preserved in the British Museum, it is necessary that they receive a new name. It is proposed therefore to call them *planiceps*, in commemoration of perhaps their most marked characteristic, namely the flatness of the upper surface of the head.

Porath's specimens were evidently somewhat faded, for he merely describes them as being "supra nigrescens, subtus pallidior." In reality the general tint of the upper surface is a deep black-brown; but when more critically examined the tergites are seen to be adorned with a median black longitudinal band and to be black at the sides, the intermediate area being of a reddish-brown tint; the legs are a pale olivaceous-testaceous colour and the tarsi are ochraceous. The stomata are small and the stoma-saddles very low.

*Sc. rugosa* of Newport, from East Africa, which Porath mistook for this species, is very different. It is a very beautiful form, the tergites being a deep black, this sombre colouring being relieved by an orange-yellow median dorsal band which

runs without interruption from the fore part of the head to the hinder end of the body; moreover the lower surface and legs are also orange-yellow, these last being beautifully ringed with black. The head, too, is deeply excavated, the stoma-saddles are elevated, and the generative forceps has its distal segment smooth and not serrate internally.

*Sc. planiceps* seems to have a wide distribution in South Africa. Porath has recorded it from the Cape of Good Hope and Caffraria, and the British Museum has a single example which was collected by Gueinzius at Port Natal.

### Fam. Lithobiidæ.

#### *Henicops maculatus*, Newport.

*Henicops maculata*, Newport, Trans. Linn. Soc., Zool. xix. p. 372, pl. xxxiii. fig. 27, and pl. xl. fig. 3; id. Catalogue Myr. Brit. Mus. p. 22.

*Henicops impressus*, Hutton, Ann. & Mag. Nat. Hist. (4) xx. pp. 114, 115 (1877); id. Tr. N. Z. Inst. x. p. 288 (1877).

*Henicops maculata*, Haase, "Die Indisch-Austral. Chilopoden," Abhandlungen Dresden Museum, 1887, no. 5, p. 36; Pocock, Ann. & Mag. Nat. Hist. (6) viii. p. 154 (1891).

*Loc.* Wellington (New Zealand).

#### *Henicops insignis*, Pocock.

*Henicops insignis*, Pocock, Ann. & Mag. Nat. Hist. (6) viii. p. 154.

*Loc.* Juan Fernandez.

#### *Henicops tristani*, sp. n.

*Colour* fusco-ochraceous; antennæ entirely flavous, legs flavous distally.

*Head* convex from side to side, the anterior median portion angularly notched. *Antennæ* short, composed of 23-24 segments.

*Coxæ* of the maxillipeds produced forwards mesially and armed with 2+2 sharp teeth. *Tergites* smooth, with all their posterior angles rounded and their hinder borders not emarginate. Coxal pores rounded, 3, 3, 3, 2. Generative forceps of the female with two short spurs rising just below the apex of the internal posterior angle of the segment; claw simple.

Length up to 10 millim.

*Loc.* Tristan Island (Tristan d'Acunha).

This species is closely related to *H. africanus* of Porath, from South Africa. It appears to differ, however, in having

fewer antennal segments. In Porath's species, judging from a number of examples sent to the British Museum from Cape Town and Port Elizabeth, the usual number of segments to these appendages is 30, but it varies from 26 to 35, whereas in *H. tristani* the number is 23 to 24 in four specimens.

*Lithobius pilicornis*, Newp.

*Lithobius pilicornis*, Newport, Ann. & Mag. Nat. Hist. xiii. p. 96. no. 5 (1844); id. Tr. Linn. Soc. xix. p. 369; Pocock, Ann. & Mag. Nat. Hist. (6) vii. p. 372.

*Lithobius Sloanei*, Newport, Ann. & Mag. Nat. Hist. xiii. p. 96. no. 6 (1844); id. Tr. Linn. Soc. xix. p. 369.

*Lithobius longipes*, von Porath, Öfv. Vet.-Akad. Förh. xxvii. p. 816 (1870); Meinert, Nat. Tidskr. (3) viii. p. 323.

*Lithobius galathea*, Meinert, Vid. Medd. Foren. 1884-86, p. 109.

Loc. Teneriffe (Canary Islands).

*Lithobius provocator*, Pocock.

*Lithobius provocator*, Pocock, Ann. & Mag. Nat. Hist. (6) viii. p. 152.

Loc. Bermuda.

*Lithobius bermudensis*, sp. n. (?).

Colour uniform fusco-ochraceous; legs flavous, head ochraceous.

Head smooth, cordate; eyes composed of about 10 ocelli, 1 + 4, 3, 2. Antennae broken off.

Coxae of the maxillipedes armed with 2 + 2 strong acute teeth.

Tergites at the posterior end of the body lightly rugose; the posterior angles of 9, 11, and 13 strongly dentate.

Coxal pores rounded, in a single series, 4, 5, 5, 4.

Anal legs long but moderately thick, armed beneath with 1, 3, 2, 1 spurs; claw spurred.

Generative forceps of the female with two longish, subequal, subparallel spurs and trilobate claw.

Length 14.5 millim., with anal leg 19 millim.

Loc. Bermuda.

I am rather doubtful as to the distinctness of this species, partly owing to the imperfection of the antennae of the type specimen and partly to my ignorance of the North-American species of the genus. I cannot, however, match it with any European species with which I am acquainted.



Fam. Scolopendridæ.

*Scolopendra morsitans* (Linn.).

Loc. St. Iago (Cape Verde); Zebu (Philippine Islands).

*Scolopendra mutilans*, L. Koch.

*Scolopendra mutilans*, L. Koch, Verh. z.-b. Ges. Wien, 1878, p. 791;  
Haase, *op. cit.* pp. 47, 48.

Loc. Yokohama.

*Scolopendra chilensis*, Gervais.

*Scolopendra chilensis*, Gervais, Ins. Apt. iv. p. 285 (1847); id. in Gay's  
Hist. de Chile, Zool. iv. p. 67, fig. 7 (1849); Meinert, Proc. Am.  
Phil. Soc. 1886, pp. 199, 200.

Loc. Valparaiso.

*Pithopus calcaratus*, Pocock.

*Pithopus calcaratus*, Pocock, Ann. & Mag. Nat. Hist. (6) vii. pp. 224,  
225.

Loc. Bahia.

*Cormocephalus violaceus* (Fabr.).

*Scolopendra violacea*, Fabr. Suppl. Ent. Syst. p. 289; Guérin-Ménéville,  
Icon. Règne Anim. ii., Ins. pl. i. fig. 8.  
*Cormocephalus calcaratus*, Porath, Öfv. Vet.-Akad. Förhandl. 1871,  
no. 9, pp. 1159, 1160.

Loc. Simon's Bay (Cape of Good Hope).

There can be very little doubt, I think, as to the correctness of the above synonymy. Fabricius's description and Guérin's figure are accurate enough to preclude the likelihood of error in the identification of the species. Newport never saw an example of it; he consequently retained the name *violacea* under the genus *Scolopendra*, an error which gave rise to two others. For, in the first place, Newport himself described a New Zealand species of *Cormocephalus* as *violaceus*, and Porath, following Newport's opinion respecting the generic position of Fabricius's *violaceus*, recharacterized it as a *Cormocephalus* which he called *calcaratus*. *C. calcaratus* is consequently a synonym of *C. violaceus* (Fabr.), and the New Zealand *violaceus* of Newport, which is different from the African, must be renamed. I propose to call it *purpureus*.

*Cormocephalus rubriceps*, Newp.

*Cormocephalus rubriceps*, Newport, Tr. Linn. Soc. xix. p. 419; Haase, *op. cit.* p. 57.

*Loc.* Maua Island (New Zealand).

On the parchment label accompanying this species is written "Centipede now confined to the island of Maua."

*Cormocephalus Huttoni*, sp. n.

*Cormocephalus violaceus*, Hutton, Tr. N. Z. Inst. x. p. 289, 1877 (not *violaceus* of Newport).

*Colour* (in alcohol and certainly faded) olivaceous or ochraceous, often with metallic lustre, the head, first segment, anal segment, legs, and antennæ pale ochraceous.

*Head* usually a trifle longer than wide, distinctly punctured. *Antennæ* composed of 17 segments, whereof about the basal 7 or 8 are naked.

*Prosternal plates* of the coxæ tolerably long, in contact, each furnished with 4 acute teeth. *Tergites* punctured, from the second bisulcate, from the eighth marginate.

*Sternites* bisulcate, not otherwise impressed.

*Anal somite*.—*Tergite* not mesially sulcate, nearly parallel-sided, a little wider than the head, but narrower than the first and twentieth; *pleuræ* densely porous, the process long, slender, tipped with two spines, another minute spine on the posterior border of the *pleuræ*; *sternite* posteriorly narrowed.

*Legs* short and moderately robust, the femur incrassate posteriorly, a little more than twice as long as wide; the process moderately large, tipped with two spines, the inner surface usually armed with 6 small spines, 2 above, 2 in the middle, and 2 below, the lower surface only very shallowly excavated, the external carina being low and armed with 2, 2 spines in two series; claw without basal spurs.

Rest of the legs with unspined tarsi.

Length up to 70 millim., of antenna 10, of anal leg 11; width of anal tergite 4·2, of head 4+.

*Loc.* New Zealand.

These specimens are specifically identical with one of Prof. Hutton's examples of his *violaceus*, Newp., which the British Museum obtained from the Otago University Museum. This specimen is ticketed Wellington; so in all probability the 'Challenger' examples came from the same locality. The Museum also has an example from Waikouaito.

The species differs from *C. purpureus*, Pocock (= *violaceus*, Newp., *cf. supra*), in having no spurs at the base of the claw on the anal leg and in having 4 spines in two series on the



lower surface of the femur of the anal leg. In *purpureus* there is a single series of 3 spines in this position and the claw of the anal leg is spurred; the anal pleuræ, moreover, have a shorter and more angular process. *C. Huttoni* is most nearly allied to *C. fuscundus* of Newport, from Van Diemen's Land and South-east Australia. It differs, however, at least in having no median sulcus on the anal tergite.

*Heterostoma rubripes*, Brandt.

*Heterostoma rubripes*, Brandt, Recueil &c. p. 65; Haase, *op. cit.* p. 89, pl. v. fig. 93.

*Loc.* Cape York (N. Australia).

*Heterostoma viridipes*, Pocock.

*Heterostoma viridipes*, Pocock, Ann. & Mag. Nat. Hist. (6) vii. pp. 56, 57, pl. iv. fig. 2.

*Loc.* Ternate.

? *Cryptops hortensis*, Leach.

*Loc.* Teneriffe.

The identification of this species is doubtful on account of the absence of the anal legs.

*Cryptops australis*, Newport.

*Cryptops australis*, Newport, Tr. Linn. Soc. xix. pp. 293 and 408.

*Loc.* Wellington (New Zealand).

*Geophilus challengerii*, Pocock.

*Geophilus challengerii*, Pocock, Ann. & Mag. Nat. Hist. (6) viii. pp. 217, 218, pl. xii. fig. 3.

*Loc.* St. Iago (Cape Verde).

Fam. Geophilidæ.

*Himantarium dimidiatum*, Meinert.

*Himantarium dimidiatum*, Meinert, Nat. Tidskr. Krøyer, (3) vii. pp. 30, 31 (1870-71).

*Loc.* Teneriffe (Canary Islands).

Recorded originally from Seville and Madeira.

*Geophilus antipodum*, Pocock.

*Geophilus antipodum*, Pocock, *loc. cit.* pp. 222, 223, pl. xii. fig. 8.

*Loc.* Wellington (New Zealand).

*Geophilus provocator*, Pocock.*Geophilus provocator*, Pocock, *loc. cit.* p. 225, pl. xii. fig. 10.*Loc.* Wellington (New Zealand).

## Class DIPLOPODA.

## Order ONISCO MORPHA.

## Fam. Glomeridæ.

*Sphærotherium angulatum*, Butler.*Sphærotherium angulatum*, Butler, Tr. Ent. Soc. 1878, p. 299, ♀.*Sphærotherium walesianum*, Karsch, Arch. Nat. 1881, p. 31, pl. ii. fig. 1, ♂.*Loc.* Queensland.Butler's specimens were from Rockhampton, the type of *walesianum* from Sydney.

## Order HELMINTHOMORPHA.

## Fam. Polydesmidæ.

*Strongylosoma gracile* (C. Koch).*Fontaria gracilis*, C. Koch, Syst. d. Myr. p. 142 (1847); id. Die Myr. ii. p. 51, fig. 173.*Paradesmus gracilis*, Latzel, Tömösvary, &c.*Loc.* Sandwich Islands (Hilo and Honolulu); Cape of Good Hope.*Strongylosoma coarctatum*, Sauss.*Paradesmus coarctatus*, Sauss. Mém. Mex. Myr. p. 39, fig. 18 (from the Mém. Soc. Phys. Genève for 1860).? *Paradesmus coarctatus*, Humb. & Sauss. Verh. z.-b. Wien, xix. pp. 670, 671 (1869).*Paradesmus vicarius*, Karsch, Arch. f. Nat. 1881, p. 38, pl. iii. fig. 8.*Strongylosoma Poeyi*, Bollman, Ent. Amer. iii. p. 81.*Loc.* Bermuda; Maetan and Zebu (Philippines).

Very common in the West Indies and in Guyana, Burma.

*Strongylosoma Guérinii*, Gervais.

(Pl. IX. fig. 2.)

*Polydesmus Guérinii*, P. Gervais, Ann. Soc. Ent. Fr. v. p. 686 (1836);

id. Ins. Apt. iv. p. 116, pl. xlv. fig. 3 (1847); Humbert and Saussure, Verh. z.-b. Ges. Wien, xix. pp. 685, 686 (1869).

*Polydesmus cylindraceus*, P. Gervais, Ins. Apt. iv. p. 117, pl. xlv. fig. 3 c.*Loc.* Teneriffe; Bermuda.

This species has hitherto been recorded from Barbary, Morocco, Algeria, and Madeira. The British Museum has many from the two latter localities.

*Strongylosoma Gervaisii* (Lucas).

(Pl. IX. figs. 1, 1a.)

*Polydesmus Gervaisii*, Lucas, Hist. Nat. Anim. Articul. Apt. p. 525 (1840); Gervais, Ins. Apt. iv. p. 118.

*Strongylosoma trilineatum*, Newport, Ann. Nat. Hist. xiii. p. 266 (1844).

*Strongylosoma Petersii*, L. Koch, Verh. z.-b. Ges. Wien, 1865, p. 882; Karsch, Arch. Nat. 1881, p. 44.

Loc. Paramatta.

*Stenonia tuberosa*, sp. n.

(Pl. IX. figs. 3-3b.)

♀. Colour deep *café-au-lait*, with the antennæ, legs, and margins of the keels brunneo-fulvous.

Antennæ short.

*Collum* convex from side to side, the anterior border evenly rounded from the apex of one keel to that of the other, the keel triangular, depressed, its posterior border oblique and not continuing the curve of the hinder border of the tergite; a transverse groove sometimes running along the anterior border, closely covered with rounded tubercles, those along the two borders larger than the others. The rest of the segments granular or tubercular like the first, all of them marked with three distinct rows of larger tubercles; the keels slightly depressed, rising a little above the middle of the side, not large, squared, the anterior border smooth, with a distinct basal shoulder, the posterior border smooth, the lateral border furnished with from 4 to 6 smooth rounded tubercles (that is including the anterior and posterior angle). *Pores* close to the lateral margin, separated from it by a space about equal to their own diameter.

*Anal tergite* evenly rounded, at most lobulate. Lateral surface of the segments closely granular and rugose.

*Sterna* not spined.

♂. A little narrower and flatter than the female, the keels being a trifle larger. The copulatory feet terminating distally in two processes, the distal simple, long, slender, and lightly curved, the proximal itself dividing into two—an upper strongly curved and dilated at its distal end, an under simple and pointed.

Length, ♂ 40 millim., width 6.5; ♀, length 44, width 7.3.

Loc. Ki Dulau (Ki Islands).

## Fam. Iulidæ.

*Iulus Moreleti*, Lucas.

*Iulus Moreleti*, Lucas, in Arthur Morelet's 'Notice sur l'Histoire Naturelle des Azores,' Paris, 1860, p. 96; Porath, Bih. Sv. Vet.-Akad. Handl. no. 7, p. 821 (1870).

*Loc.* Bermuda.

Described originally from the Azores by Lucas and subsequently recorded by Bollman from Bermuda. The British Museum has examples of what is apparently the same species from Madeira.

*Iulus canariensis*, sp. n.

*Colour* black, in spirit greyish blue banded with black; legs pale.

*Body* very long and slender.

*Head* smooth, with a frontal sulcus and a transverse stria between the eyes; without apparent frontal setæ. *Eyes* large, with ocelli distinctly defined, arranged in six transverse rows. *Antennæ* absent.

*Collum* smooth above, triangular laterally, striate just above the angle. The rest of the segments with complete transverse sulcus and a median dorsal longitudinal sulcus, all of them, including the second, longitudinally striated behind the sulcus, the striæ fine, complete, and very close-set, the area in front of the sulcus smooth. *Pores* large, situated about one third of the distance behind the sulcus, which is at this spot lightly sinuate forwards, the space between the sulcus and the pore not striate.

*Anal tergite* not surpassing the valves; valves convex, not compressed or marginate.

Anterior legs of the male hook-like.

Number of segments about 60.

Length up to about 26 millim.

*Loc.* Teneriffe.

In its black colouring, slender build, position of pores, &c. this species at first sight seems to fall into the *Ophiulus* section of Berlese; but the absence of a spine on the terminal segment serves at once to distinguish it.

*Iulus tristani*, sp. n.

(Pl. IX. figs. 5, 5a.)

*Colour* fuscous or flavous and fusco-annulate; head yellower, with fuscous fascia between the eyes; legs and antennæ flavous; anal somite fuscous.

*Head* smooth, without frontal setæ. *Eyes* obscurely manifested, represented by a patch of black pigment. *Antennæ* short, scarcely surpassing the collum.

*Collum* laterally angular and marked with a few striæ. The first five segments smooth above, striate at the sides; the rest striate above and at the sides, the striæ not close-set and not reaching the hinder border of the segments. The sulcus complete and deep, crenulate, the area in front of it smooth. The *pores* conspicuous, situated just behind the sulcus, and, except at the hinder end of the body, touching it, the sulcus being posteriorly angled to meet the pore.

*Anal tergite* covering the summit of the valves, sometimes just surpassing them; valves convex, not compressed, and scarcely hairy; *sternite* triangular.

*Legs* short.

♂. Smaller and thinner than female. The first pair of legs small and hook-like; the second pair without coxal processes; the second segment of the mandible produced backwards into a large rounded prominence.

Number of segments up to 44.

Length up to 15 millim.

*Loc.* Inaccessible Island and Tristan Island (Tristan d'Acunha).

*Iulus solitarius*, sp. n.  
(Pl. IX. fig. 4.)

*Colour* very like that of *I. pusillus* of Leach; two longitudinal flavous dorsal bands, the median dorsal line and the sides of the body black, the lower surface and legs flavous; antennæ and space between the eyes fuscous.

*Head* lightly punctulate, without distinct frontal pores. *Eyes* well developed, subcircular, composed of at least five distinct rows of well-defined ocelli. *Antennæ* a little longer than in the preceding species.

The *collum* laterally acutely triangular, margined, its anterior border lightly sinuate; the first three or four segments smooth above, striate at the sides, the rest striate above and below, the striæ deep but not close-set and not reaching the hinder border of the segments. The sulcus deep, the area behind it raised, that in front of it smooth. *Pores* scarcely at all conspicuous, situated just behind the sulcus but touching it, the sulcus lightly anteriorly angled.

*Anal tergite* surpassing the valves a little, the process short and down-curved; valves convex, not compressed, and smooth; *sternite* acutely triangular and very long.

*Legs* longer than in *I. tristani*.

♂. Smaller and thinner than female. The first pair of legs small and hook-like, the second pair with simple coxæ; mandible angularly produced.

Number of segments 33-34.

Length up to about 10 millim.

*Loc.* Tristan d'Acunha (Inaccessible Island and Tristan Island).

*Iulomorpha Porathi*, sp. n.

*Colour* black, with two flavous or testaceous spots on the dorsal area of the segments, constituting two parallel flavous bands; anal tergite black and polished, anal valves, legs, and antennæ testaceous; head fusco-ferruginous, with a deeper fascia between the eyes.

*Head* smooth, with weak frontal sulcus and a fine stria between the eyes; labral pores 4+4. *Eyes* widely separated, small and triangular, composed of about three transverse rows of ocelli. *Antennæ* longish, reaching past the second segment.

*Collum* laterally elongate, triangular, with a marginal sulcus and two longitudinal sulci, smooth above. The rest of the segments without trace of a transverse sulcus, merely marked by a shallow transverse groove, the area behind this groove smooth above, inferiorly finely ridged longitudinally, the covered area of the anterior portion closely and finely transversely striate in front. The *pores* large, above the middle of the side at some little distance behind the transverse groove. *Sterna* finely striolate.

*Anal tergite* covering but not surpassing the valves; valves convex, not compressed and not marginate.

*Sternum* obtusely rounded.

*Legs* sparsely setose beneath.

Number of segments 47.

Length about 36 millim., width 2.5.

*Loc.* Malamaui (Philippine Islands). Two female examples.

I take great pleasure in dedicating this striking species, the second known of the genus, to Dr. C. O. von Porath, who was almost the first zoologist to describe exotic Myriopoda with accuracy.

This new form *I. Porathi* agrees tolerably closely with the South-African *I. Kinbergi* in most of its structural features. It may at once be recognized, however, by its marked colouring and smaller number of segments.

The second example, measuring only about 12 millim., with



35 segments, and apparently the young of the large one described, has the yellow dorsal spots much smaller and visible just above the pore, the collum almost entirely flavous, and a faint though distinct transverse stria on the segments.

*Spirostreptus chilensis*, Gervais.

*Iulus chilensis*, Gervais, Ins. Apt. iv. p. 193; id. in Gay's Hist. de Chile, Zool. iv. p. 61, fig. 3 (1849).

*Spirostreptus chilensis*, Porath, Bih. Sv. Vet.-Akad. Handl. iv. no. 7, p. 41.

*Loc.* Valparaiso.

*Spirostreptus erythropareius*, Brandt.

*Spirostreptus erythropareius*, Brandt, Bull. Ac. Sci. St.-Pétersb. viii. nos. 175 and 176, p. 111 (1841); Gervais, Ins. Apt. iv. p. 155; Porath, Öfv. Vet.-Akad. Förh. 1872, no. 5, p. 36.

*Spirostreptus rubripes*, Newport, Ann. & Mag. Nat. Hist. xiii. p. 270 (1844).

*Loc.* Cape of Good Hope.

*Spirostreptus Moseleyi*, sp. n.  
(Pl. IX. figs. 6, 6 a.)

*Colour* brunneo-fuscous; legs and antennæ ferruginous.

*Body* moderately robust, not attenuated at its posterior end, narrowed at about the fourth segment.

*Head* sculptured below, nearly smooth and faintly sulcate above. *Eyes* acutely angled internally, separated by a space that is greater than a diameter. *Antennæ* about as long as the head.

*First tergite* narrowed laterally, both the anterior and posterior border lightly emarginate, the anterior angle roundedly rectangular, the posterior acutely rectangular; a strong marginal sulcus and two abbreviated sulci. The rest of the somites with conspicuous and complete transverse sulcus, the anterior covered area finely transversely striolate, the median and posterior portions finely sculptured, the sculpturing consisting of fine close-set longitudinal striolæ; the posterior portion longitudinally striate about a third of the way up to the pore; pores behind the sulcus. *Ventral grooves* long, but not quite as long as the two basal segments of the leg.

*Anal somite* large, punctulate; *tergite* posteriorly angled, lightly constricted, the process not projecting beyond the apex of the valves; *valves* convex, prominent, with their margins strongly compressed; *sternite* triangular, without trace of suture.

*Legs* short, mostly with a single seta on the lower surface of each segment.

Number of segments 70.

Length about 115 millim.

A single female example from Malamaui (Philippines).

This species differs from all the Indo- and Austro-Malayan forms that are characterized by long ventral grooves in that there is no caudal process overlapping the valves.

#### ACANTHIULUS, Gervais.

*Acanthiulus*, Gervais, Ann. Sci. Nat. (3) 1, p. 70; Ins. Apt. iv. p. 173.

The species of *Acanthiulus* can scarcely be regarded as more than extremely well-marked forms of *Spirobolus*. The constitution of the mouth-parts and the number and disposition of the legs of the anterior segments are the same in the two groups. In fact the only character by which *Acanthiulus* is to be distinguished is the presence of a transverse row of (8) spiniform tubercles on most of the segments. Nevertheless the collum is undoubtedly much longer than is usually the case in *Spirobolus*. This last character no doubt misled Gervais into stating that his species belonged to the genus *Spirostreptus* of Brandt, and probably this statement, coupled with the presence of the spines on the segments, will account for Latzel's erroneous surmise that *Acanthiulus* and *Trachyiulus* were synonyms.

#### *Acanthiulus Murrayi*, sp. n. (Pl. IX. figs. 7-7 b.)

*Colour* black or olivaceous, with a series of red spots on each side marking the pore; legs and antennæ olivaceous, with the distal ends of the segments flavo-annulate.

*Face* entirely smooth, the frontal sulcus mesially interrupted; labral border somewhat deeply excised; pores 2+2. *Eyes* well developed, subcircular, separated by a space equal to about twice a diameter. *Antennæ* long and slender, much longer than the face.

*Collum* smooth above, projecting laterally below the level of the second segment, the anterior border of the lateral portion widely emarginate and defined by a deep sulcus, which curves round the inferior border, the posterior border deeply and abruptly emarginate; the inferior surface of the second segment flat, with carinate anterior border, the posterior margin of this segment longitudinally grooved below, irregularly wrinkled above, with a squamiform tubercle in the middle of the lateral surface; the third, fourth, and fifth segments sculptured like the second, but more coarsely, the

squamiform tubercles that are so characteristic of the succeeding segments becoming gradually more and more manifested. The rest of the segments with their posterior portions longitudinally grooved or wrinkled from base to summit and furnished with 8 equidistant, spiniform, squamiform tubercles, forming 8 longitudinal rows of spines: the lowest of these series is situated just below the middle of the side and begin on the seventh segment; the second series, beginning at the sixth segment, is situated just below the level of the pores, the spines are larger than those of the lowest series; the upper series on each side is composed of flatter tubercles, which, nearly obsolete on the anterior segments, become spiniform only at the hinder end of the body; in the middle line of the dorsum there is a faint indication of a similar series of tubercles. The tubercular area of the segments is lightly elevated and separated from the anterior area, which is rugose and finely transversely striolate in front, by a shallow depression representing the transverse sulcus. Pores conspicuous, situated in front of the sulcus and just above and in front of the large tubercle of the median lateral series; the anterior pore far below (1.5 millim.) the level of the rest, and situated immediately in front of the tubercle, which is itself lower than those on the rest of the segments. *Sterna* finely striolate transversely.

*Anal somite* large; *tergite* without spines but rugulose, the posterior angle elongate but not surpassing the summit of the valves; *valves* with strongly compressed margins, finely rugulose in front, coarsely rugose and punctured behind; *sternite* large and angular.

*Legs* longish and slender, with a single seta below each segment, except the tarsus, which has about three; the anterior legs, at least in female, shorter, thicker, and more setose beneath.

Number of segments 50.

Length 111 millim., width 11.

*Loc.* Wokan Dobbo (Aru Islands).

*Acanthiulus Blainvillei*, Le Guillou\*, from New Guinea, the only other known species of the genus, differs from this new form, if we may trust Gervais's figure, in having the antennæ shorter than the face, the antero-lateral border of the collum less widely emarginate, and the posterior angle more strongly produced. Moreover the spiniform tubercles are well developed on the anterior segments.

\* Bull. Soc. Phil. Paris, 1841, p. 86; Gervais, Ins. Apt. iv. p. 173, pl. xlv. fig. 8.

I have great pleasure in dedicating this interesting new species to Dr. John Murray.

*Spirobolus monilicornis*, Porath.

*Spirobolus monilicornis*, Porath, Bih. Sv. Vet.-Akad. Handl. iv. no. 7, p. 31 (1876).

*Spirobolus Heilprini*, Bollman, Proc. Ac. Philad. 1889, p. 127.

? *Spirobolus virescens*, Daday, Term. füzetek, xiv. p. 140, pl. vii. figs. 8-10.

*Loc.* Bermuda.

This species occurs commonly in many of the West-Indian Islands and also abundantly in Demerara. Dr. Porath's examples were ticketed Brazil. *S. Heilprini* was described from Bermuda, and *virescens*, which appears to be the same species, from Trinidad.

*Spirobolus digrammus*, sp. n.

(Pl. IX. figs. 9-9 b.)

? *Spirobolus tessellatus*, Porath, *op. cit.* p. 21 (in part only, *i. e.* the example from the Cape).

*Colour*.—Head fuscous above, flavous below the eyes; legs and antennæ bright red, concolorous; first tergite black, with its anterior border blood-red, the rest of the segments blood-red in their lower half, black in the upper, with two complete parallel blood-red bands running from the posterior margin of the first tergite to the anal somite; anal valves red.

*Head* punctulate, with a median sulcus above and below, with four labral pores. *Eyes* separated by a distance about equal to twice a diameter, subcircular, each composed of about 44 ocelli.

*First tergite* punctulate or striolate, the lateral portion narrowed to an angle, with only an anterior marginal sulcus. The rest of the tergites punctulate and striolate throughout, longitudinally striate laterally behind the transverse sulcus, but the striae not extending as high as the pore; the transverse sulcus nearly obsolete above. The *pores* large, above the middle of the side, the anterior the lowest, close to each is a posterior longitudinal stria; *scobina* present in most of the somites, but small.

*Anal somite* punctulate, the *tergite* with a somewhat sharp but short median posterior angle; *valves* convex, with margins neither sulcate nor compressed; *sternite* posteriorly angled.

*Legs* short, with a single seta above the claw and each segment furnished distally beneath with one seta; the male with the distal segment padded beneath.

*Copulatory feet* of the male as in fig. 9 b.

Number of somites 45-46.

Length about 40 millim.

*Loc.* Cape Town (Simon's Bay).

So far as colouring is concerned this species approaches *Sp. formosus* of Porath; but I infer from the description of this last that the red dorsal bands are not continuous. Moreover, *formosus* is said to be "læve," and the anal valves are compressed. In colouring again this species very much resembles *Sp. litoralis*; but in *litoralis* the whole head is red and the dorsal spots are not continuous from segment to segment. Porath mentions one specimen of *litoralis* (his *tessellatus*) as coming from Cape Town and having a fuscous band between the eyes. This example, I strongly suspect, is in reality to be referred to this species.

*Spiroboldus cupulifer*, Voges.

*Spiroboldus cupulifer*, Voges, Zeitschr. wiss. Zool. xxxi. p. 188.

*Loc.* Zamboanga and Zebu (Philippine Islands).

Recorded originally from Bohol.

*Spiroboldus challengerii*, sp. n.

(Pl. IX. figs. 10-10 c.)

*Colour* olivaceo-fuscous, most of the segments adorned posteriorly and laterally with an inferiorly narrowed orange-yellow stripe, which runs along the hinder margin, beginning on a level with the pore and extending halfway towards the legs; legs and antennæ narrowly testaceo-annulate.

*Head* convex, shining, smooth or only very finely striolate, with two pores on each side of the labrum, with a longitudinal mesially nearly obsolete sulcus. *Eyes* subcircular, consisting of about seven transverse rows of ocelli, separated by a space equal to twice a diameter. *Antennæ* short, shorter than the head, segments subequal.

*First tergite* smooth, its anterior edge lightly emarginate on a level with the eye, the inferior angle wide, subacute, with a faint anterior sulcus. The rest of the somites finely striate laterally, the striæ falling far short of the pore, the posterior portion smooth above, the anterior portion only very finely striolate, the transverse sulcus visible only at the sides. The *pores* conspicuous, situated just behind the position of the sulcus, above the middle of the side. *Scobina* large, crescentic, extending from about the tenth to about the fortieth segment, but very small towards the end of the body.

*Anal tergite* smooth above and scarcely constricted, pro-

duced behind into a short caudal process which scarcely covers the tops of the valves; *valves* with their margins widely compressed; *sternite* large, rounded, obtuse-angled.

*Legs* with a single seta on the lower surface of each segment; none of the segments padded; the coxæ of the third, fourth, and fifth legs produced, and the inferior surface of these legs, as well as of the sixth and seventh, inflated beneath.

*Copulatory feet* with the anterior median lamina wide, half-moon-like above, bearing a median, downwardly directed, slender, pointed linguiform process, which projects far below the level of the anterior lateral lamina and also below that of the posterior lateral lamina.

Number of somites 46-48.

Length 83 millim.

Two male examples from Ki Dulau, one of the islands of the Ki or Kei group, in the Banda Sea, off the coast of New Guinea.

*Spirobolus flavo-collaris*, sp. n.  
(Pl. IX. fig. 11, 11 a).

Closely allied to the preceding species.

*Colour* dark greenish black, with the legs, antennæ, labial border, and posterior border of the somites ochraceous; the collum entirely bordered with ochraceous, the anterior stripe wider than the posterior. The somites smooth, striate below, the sulcus very feeble, obsolete above; *scobina* large and extending to about the thirty-sixth segment.

The *anal somite* small, the hinder end of the body being narrowed from above downwards and from side to side; the posterior border of the tergite produced into an angle of about 90°; the valves prominent, very lightly compressed behind.

Number of somites 52.

Length about 50 millim., width 6.5.

A single example from Wokan Dobbo, Aru Island.

*Spirobolus dorsalis* (Le Guillou).  
(Pl. IX. fig. 8.)

*Iulus dorsalis*, Le Guillou, Bull. Soc. Phil. Paris, 1841, p. 86; Gervais, Ins. Apt. iv. p. 175.

*Colour*.—The posterior borders of the segments fuscous-ferruginous, the anterior part testaceous; a large anteriorly narrowed black spot in the middle line of the back, the series of spots constituting a continuous longitudinal dorsal band from the collum to the end of the anal tergite; a fuscous patch marking the pore; the collum widely flavous along its



anterior border and lateral angles; upper half of head fuscous, lower flavous; antennæ distally fuscous; legs flavous.

*Face* smooth, indistinctly sulcate. *Pores* 2+2. *Eyes* large, separated by a space that is about equal to a diameter. *Antennæ* slender and longish, extending to the end of the second segment.

*Collum* laterally acutely angled, the posterior border vertical, the anterior obliquely cut away and lightly emarginate, the apex not reaching the inferior border of the second. The rest of the segments lightly punctulate and striolate above, the longitudinal striæ of the lateral portion extending almost up to the pore and passing on to the area in front of the transverse sulcus; this sulcus represented dorsally by a shallow depression, sinuate opposite the pore, which is situated in front of it above the middle of the side. *Sterna* very finely striolate. *Scobina* absent.

*Anal tergite* covering the valves but not surpassing them, roundly angled; *valves* lightly compressed, not marginate; *sternite* acutely triangular.

*Legs* long and slender, with a single seta on the lower edge of each of the first four segments, and a series of three or four on the tarsus, not padded.

Number of segments 50.

Length 51 millim., width 4.

A single male from Wokan Dobbo (Aru Island).

This species falls into the same category with *Sp. Goësi* of Porath, but the sculpturing is much finer and the colouring very different.

*Spirobolus hæmorrhantus*, sp. n.  
(Pl. IX. figs. 12, 12 a.)

*Colour* (in alcohol) bright blood-red throughout.

*Face* smooth; sulcus mesially obsolete. *Pores* 2+2. *Eyes* large, with upper inner border angular, separated by a space slightly greater than a diameter. *Antennæ* long and slender, much longer than the face, surpassing the collum.

*Collum* polished, acutely angled below, and projecting nearly as far as the inferior portion of the second segment. The rest of the segments smooth and polished behind dorsally, at most lightly wrinkled longitudinally, striolate in front. No *scobina*. The lateral striæ extending in front of the transverse sulcus and reaching almost up to the pore; the transverse sulcus obsolete or nearly so, represented by a shallow depression. The *pores* minute above the middle of the side, in front of the transverse sulcus; *sterna* striate.

The posterior end of the body noticeably compressed; the

anal tergite scarcely covering the valves, which have their borders prominent and deeply compressed; sternite large and angular.

Legs long and slender.

Number of segments 55.

Length about 70 millim., width 5.5.

Loc. Ki Dulau (Ki Islands).

This species, of which a single female specimen was obtained, in colouring resembles *Sp. sanguineus* of C. Koch (Die Myriop. i. p. 16, fig. 15). It, however, at least differs in its long legs and antennæ and prominent anal valves.

#### EXPLANATION OF PLATE IX.

Fig. 1. *Strongylosoma Gervaisii* (Lucas). Dorsal view,  $\times 1\frac{1}{2}$ . In this figure the anterior angles of the keels are too squared and the legs are wrongly placed and wrong in number.

Fig. 1 a. Ditto. Left copulatory foot from below.

Fig. 2. *Strongylosoma Guérinii*, Gerv. Left copulatory foot from below.

Fig. 3. *Stenonia tuberosa*, sp. n. Keel of the twelfth segment from above.

Fig. 3 a. Ditto. Anal segment from above.

Fig. 3 b. Ditto. Copulatory foot from below.

Fig. 4. *Iulus solitarius*, sp. n. Anal segment from the side.

Fig. 5. *Iulus tristami*, sp. n. Anal segment from the side.

Fig. 5 a. Ditto. Part of segment to show position of pore.

Fig. 6. *Spirostreptus Moseleyi*, sp. n. Lateral view of head and collum,  $\times$ .

Fig. 6 a. Ditto. Lateral view of anal segment.

Fig. 7. *Acanthiulus Murrayi*, sp. n. Lateral view of anterior end of body,  $\times$ .

Fig. 7 a. Ditto. Lateral view of two of the middle segments.

Fig. 7 b. Ditto. Lateral view of posterior end of body.

Fig. 8. *Spirobolus dorsalis* (Le Guillou). Lateral view of head,  $\times$ .

Fig. 9. *Spirobolus digrammus*, sp. n. Lateral view of head and collum,  $\times$ .

Fig. 9 a. Ditto. Lateral view of anal segment,  $\times$ .

Fig. 9 b. Ditto. Anterior view of copulatory feet.

Fig. 10. *Spirobolus challengerii*, sp. n. Lateral view of head and collum,  $\times$ .

Fig. 10 a. Ditto. Lateral view of anal somite,  $\times$ .

Fig. 10 b. Ditto. Third leg of male.

Fig. 10 c. Ditto. Anterior view of copulatory feet.

Fig. 11. *Spirobolus flavo-collaris*, sp. n. Lateral view of anal segment,  $\times$ .

Fig. 11 a. Ditto. Anterior view of copulatory feet.

Fig. 12. *Spirobolus hæmorrhantus*, sp. n. Lateral view of head and collum,  $\times$ .

Fig. 12 a. Ditto. Lateral view of anal segment,  $\times$ .

#### XVII.—The Influence of Light on the Coloration of Crustaceans. By A.-E. MALARD\*.

M. MARTIN has recently drawn the attention of our Society to a peculiar case of albinism which he had studied in a lobster

\* Translated from the 'Bulletin de la Société Philomathique de Paris,' 8<sup>ème</sup> série, t. iv. no. 1 (Paris, 1892), pp. 24-30.